

# *“A Preliminary Discussion of TDS and Potential BMP Applications in the Callahan Creek TMDL Watershed”*

Presented on Behalf of  
The Virginia Coalfields TMDL Group

By

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# Virginia Coalfields TMDL Group

Arch Coal, Inc.

Lone Mountain Processing Company, Inc.

Paramont Coal Company Virginia, LLC

Cumberland Resources Corporation

Powell Mountain Coal Company

Lee County Board of Supervisors

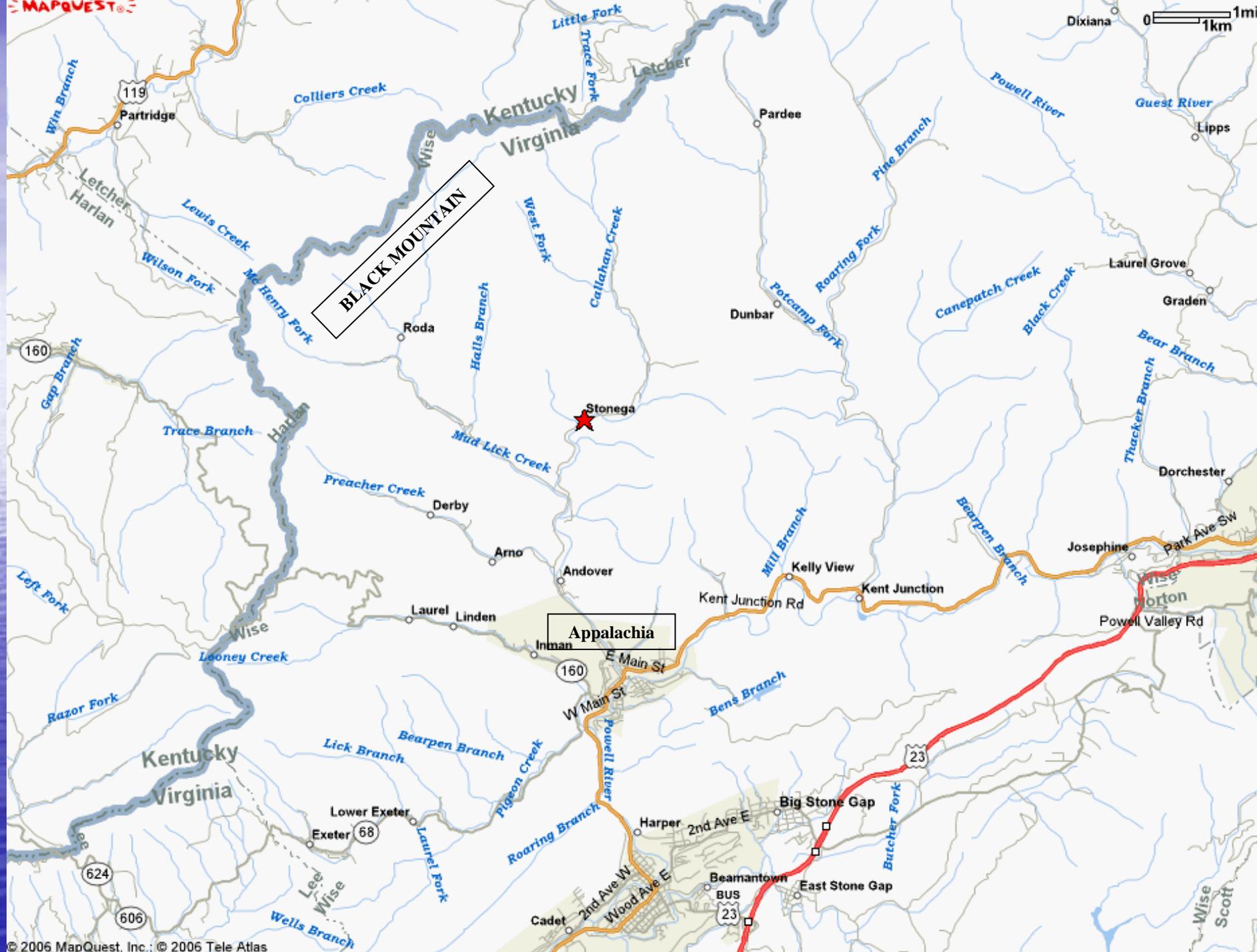
Virginia Mining Association

## **Group Objective:**

To protect and restore water quality within Virginia's coalfield counties through regulatory proceedings that are scientifically sound, legally valid and otherwise reasonable and practicable.

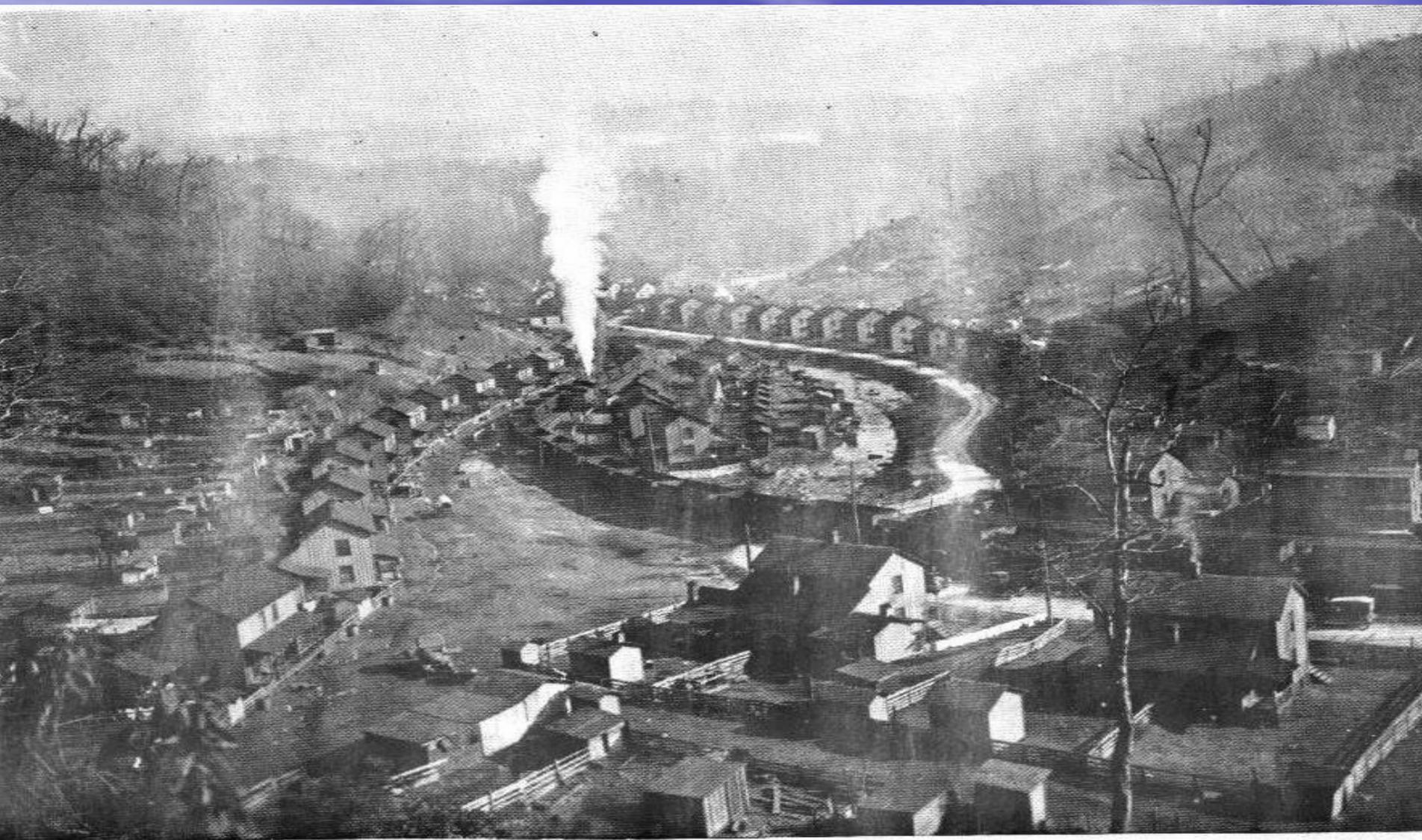
# Callahan Creek TMDL

- The final TMDL Report for Callahan Creek was approved by EPA in July, 2006.
- Callahan Creek is located in the northwestern part of Wise county and flows from the base of Black Mountain south through Stonega and Andover before joining with the Powell River at Appalachia.
- Coal mining has been conducted in the Callahan Creek watershed since 1905. There are currently several large mining operations in the Callahan Creek watershed (Cumberland Resources, Arch Coal, A&G Coal, Appalachia Coal, Commonwealth Mining, etc.)



BLACK MOUNTAIN

Appalachia



Stonega, Va. about 1919.



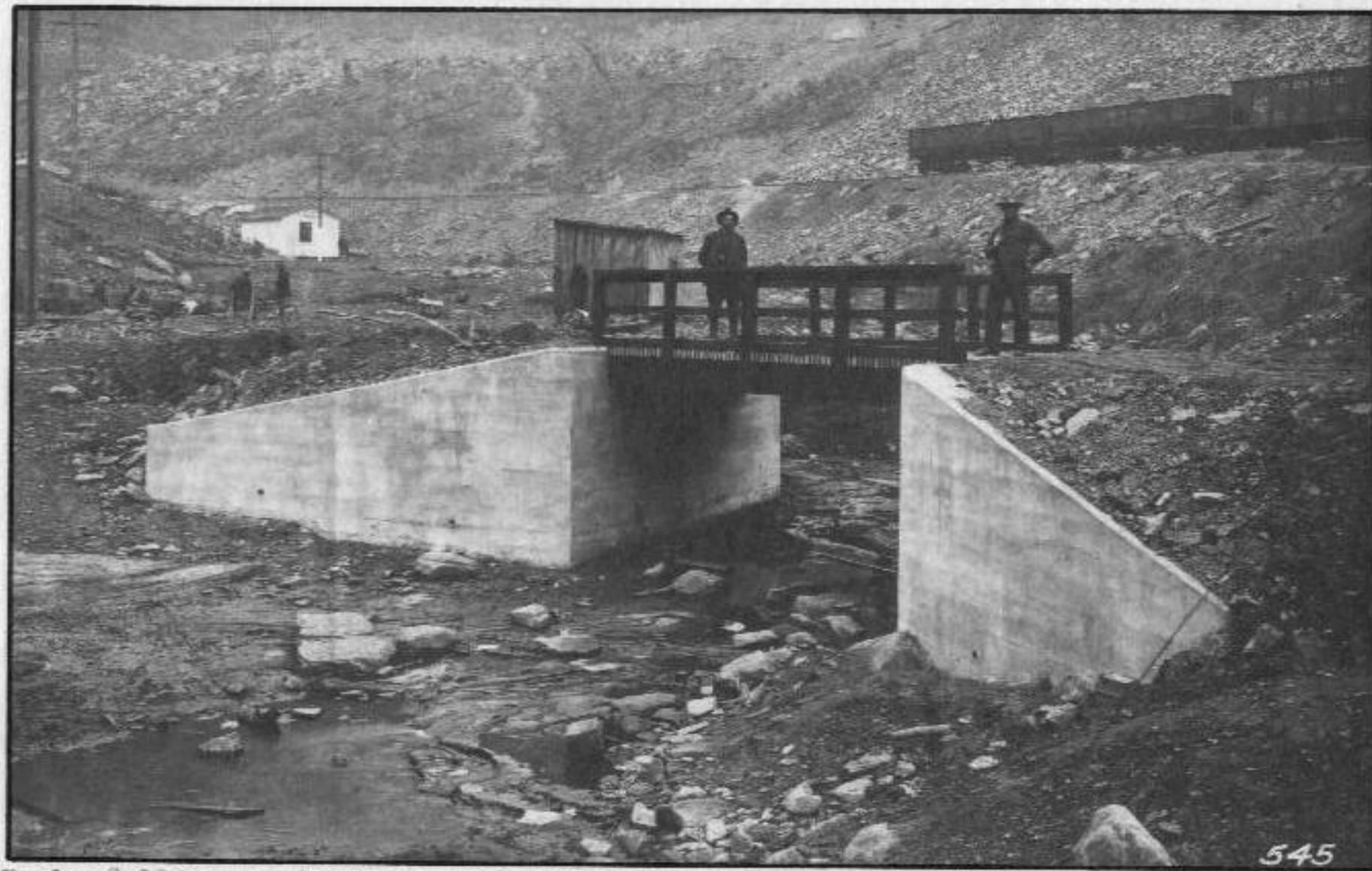
REARRANGEMENT OF TRACKS BELOW STONEGA NO. 3 TIPPLE



REARRANGEMENT OF TRACKS ABOVE STONEGA NO. 3 TIPPLE.



Stonega Colliery: Electric installation on Coke Ovens.



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Derby Colliery: Concrete road bridge abutments, near Bath House site.

# Callahan Creek TMDL

- The TMDL report identifies the stream “stressors” as fecal coliform, total suspended solids (TSS) and total dissolved solids (TDS).
- Callahan Creek is densely populated. The sources of fecal coliform in Callahan Creek are straight pipes and failing septic systems from domestic sources. The report recognizes that there are no industrial sources of fecal coliform in Callahan Creek, therefore no reductions in fecal coliform from industrial (mining, etc.) sources are proposed.









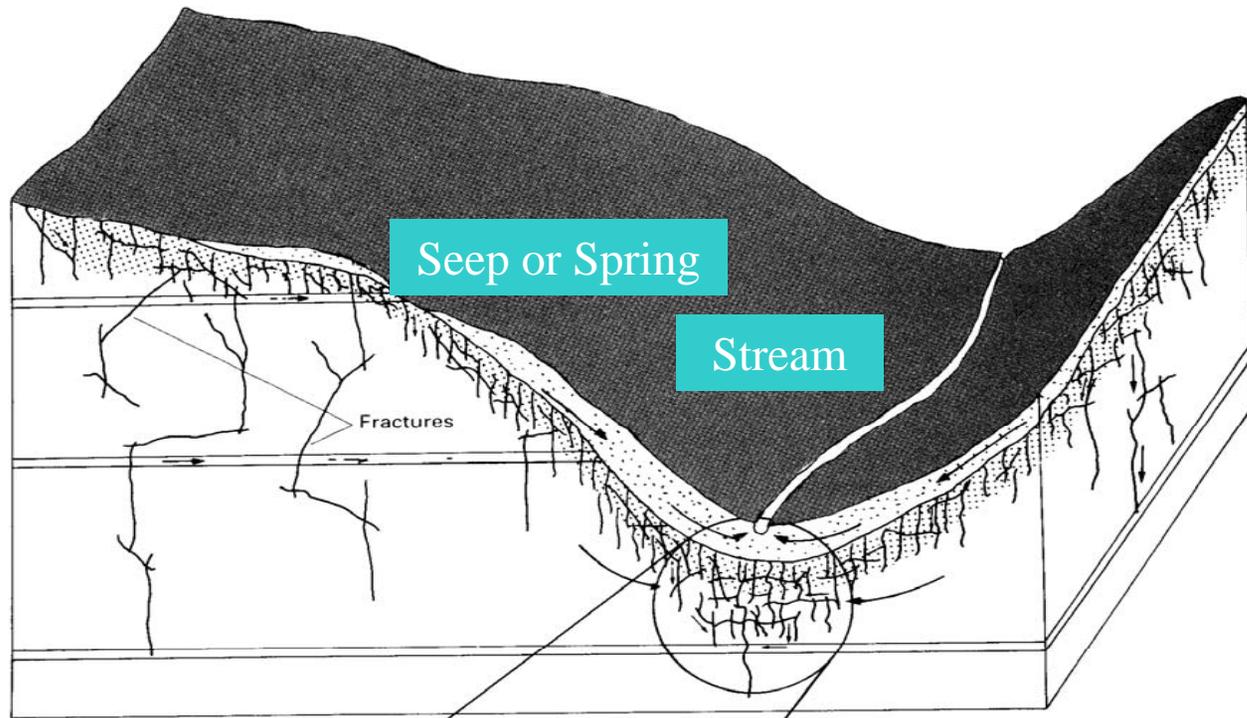


# TSS

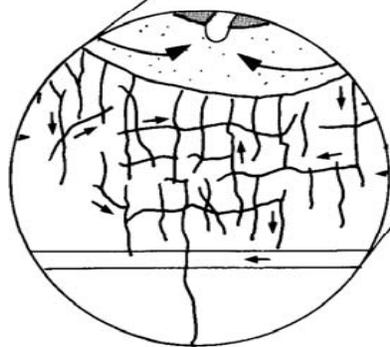
- **TSS** is visible sediment produced by runoff from disturbed areas (mining, timbering, development, roads, etc.). The TMDL report recognizes that the sediment control measures required by law and currently utilized at mining operations (ponds, etc.) have proven effective at controlling TSS. Therefore, no TSS reductions are proposed for permitted mining operations. TSS reductions are proposed for other land uses (logging, development and abandoned mine lands).

# TDS

- **TDS** is comprised of tiny (less than 0.5 microns), invisible particles dissolved in the water. For Callahan Creek, the predominant ions in solution are **carbonate, bi-carbonate, calcium, sulfate, magnesium, potassium and chloride**. In natural conditions, these ions are leached from the minerals in the rocks by infiltration of runoff into the subsurface and subsequent transport through the fracture-flow groundwater system. This process can be accelerated and/or amplified by mining operations.



Not to scale



Enlargement

EXPLANATION

-  Colluvium and alluvium
-  Weathered bedrock
-  Unweathered bedrock
-  Coal seam
-  Fractures
-  General ground-water flow direction
-  Possible ground-water flow paths

*Conceptualized Fracture – Flow Groundwater System (after Harlow and LeCain, 1991)*

# TDS

- While we acknowledge that TDS, at higher concentrations, may be a stressor to aquatic life, several biological scientists (including PhD's from Va. Tech) believe the primary stressor in Callahan Creek is **lack of habitat**.



# Existing Watershed Improvement Programs

- Remining
- AML Projects (both standard and “no cost”)
- Appalachian Clean Streams Initiative
- Section 404 Stream Mitigation Projects
- Sustainable Development

# Best Management Practices (BMP's)

- The primary strategy of the TMDL plan for permitted mining operations in Callahan Creek is the implementation of BMP's.
- Structural BMP's and Non-Structural BMP's
- ATS Report (March, 2006) addressed the projected cost of implementing various BMP's.
- **Green = Minimal Cost**
- **Yellow = Significant Cost**
- **Red = Cost Prohibitive**

# Structural BMP's

- Sediment Ponds
- Diversion Ditches
- Haulroad Pavement
- Haulroad Sumps
- Infiltration Channels
- Check Dams
- Silt Fence
- Constructed Wetlands

# Non-Structural BMP's

- Minimizing Disturbed Areas
- Minimizing Time / Distance for Reclamation
- Stabilizing Backfill Material
- Straw and Mulch
- Vegetative Filters
- Stream Buffer Restoration
- Daylighting of Old Works

# Effectiveness of BMP's

- Typical stormwater and mining-related BMP's have proven effective at reducing **TSS**.
- The effectiveness of BMP implementation for reduction of **TDS** is unknown at this time (little or no research). Various study proposals have been submitted to OSM for funding to study this issue.

# Conclusions

- The Va. Coalfields TMDL Group supports the use of **cost-effective** BMP's (especially re-mining) for overall watershed improvement .
- The implementation of BMP's is likely to be effective for reducing TSS loads. **Further research is needed to investigate the effectiveness of BMP's for TDS reduction.**
- Additional TDS and flow data is needed and is being collected.
- Additional biological studies are also needed (habitat assessments, benthic sampling and TDS toxicology studies).